cells and progenitor cells exhibiting vasculogenesis had died. These endothelial cells were then transduced with the gene for prourokinase and seeded onto expanded polytetrafluoroethylene graft material followed by testing for adherence as described in the article. Thus, we were able to obtain sufficient cells, not only for seeding, but transduction before seeding.

Cells that were exposed to magnetic beads in the process of isolation were not suitable for cell expansion because they phagocytosed some of the magnetic beads, so proliferation was too slow. We also found that too few cells were isolated by the magnetic-bead method to make this a feasible method for seeding grafts.

Upon checking our original data, we discovered that we isolated $1.52 \pm 0.43 \times 10^6$ mononuclear cells per mL of peripheral blood, which is comparable to what Dr Tiwari and colleagues obtained. On page 185 we reported that tenfold fewer cells were isolated, a computational mistake. In a separate publication[1] we reported approximately the same values as Dr Tiwari and colleagues. In this same publication, we further describe isolation and proliferation of cells from adult peripheral blood. In addition, we have completed studies with a series of dogs having carotid artery grafts seeded with jugular vein endothelial cells on one side and peripheral blood stem cell derived endothelial cells on the other side, harvested at 1- and 6-month intervals, which show no difference in patency whether seeded with jugular vein endothelial cells or peripheral blood stem cell derived endothelial cells.[2,3]

Laurace E. Townsend, PhD
Michael Boyer, MD
Michelle Vogel, MD
Jeffrey Falk, MD
Darlene Reitz-Vick, BS
Katrina T. Trevor, PhD
Mario Villalba, MS
Phillip J. Bendick, PhD
John L. Glover, MD

REFERENCES

1. Hernandez DA, Townsend LE, Uzieblo MR, Haan ME, Callahan RE, Bendick PJ, et al. Human endothelial cell cultures from progenitor cells obtained by leukapheresis. Am Surg 2000;66:355-9.
2. Townsend LE, Park D, Markham K, Callahan RE, Bendick PJ, Glover JL. ePTFE grafts seeded with endothelial cells derived from stem cells in peripheral blood remain patent for 6 months in the canine carotid interposition model. 11th International Vascular Biology Meeting; 2000 Sep 5-9; Geneva, Switzerland. J Submicroscopic Cytology Path 2000;32:409.

24/41/121063
doi:10.1067/mva.2002.121063

Regarding "Bedside vena cava filter placement guided with intravascular ultrasound"

We wish to commend the authors for their work in development of intravascular ultrasound (IVUS) guided delivery of inferior vena cava (IVC) filters at the patient's bedside (J Vasc Surg 2001;34:21-6). In the intensive care setting, a small proportion of patients cannot be transported safely to the interventional radiology suite for conventional fluoroscopically guided IVC filter placement. At our institution, this usually involves patients with closed head injuries and elevated intracranial pressure that compromises cerebral perfusion when the patient is placed supine. For the readership without access to or experience with IVUS but who have portable fluoroscopy and cooperative interventional radiologists, we would like to point out a technique for bedside placement of IVC filters developed at the University of California, San Diego.[1] Transcutaneous duplex ultrasound scanning is used to assess the internal jugular and common femoral veins bilaterally to plan venous access and the IVC to obtain diameter measurements for specific filter selection. Portable fluoroscopy with digital subtraction angiographic capability is used to perform transcatheter contrast inferior vena cavography and bilateral renal venography to confirm IVC diameter measurements and to evaluate for possible renal vein and IVC anatomic variants that would alter filter placement. Real-time fluoroscopy is used to guide device manipulation and assess adequacy of filter placement after deployment.

We do not believe that bedside IVC filter placement is appropriate in patients without strong contraindications to transport to the interventional radiology suite. The financial arguments based on differential hospital charges for bedside IVC filter placement are irrelevant given our current reimbursement environment. Tradeoffs for bedside IVC filter placement can be considerable. In the case of bedside IVC filter placement, breaches in the sterile field are more likely (eg, a guidewire touching objects outside the improvised sterile field), inventory is limited if difficulty is encountered or items are dropped, the gold standard technique of contrast venography is not used for identifying IVC and renal vein variant anatomy that may alter the placement of the filter is not used,[2] and there is no mechanism for identifying, much less correcting, maldeployed filters (eg, excessive tilt, asymmetric leg deployment, or overlapping filter struts).[3,4]

In summary, we believe that bedside IVC filter placement is a valuable alternative for these few patients with prohibitive risks for transport, but it is a suboptimal technique for most patients.

Steven C. Rose, MD
Thomas B. Kinney, MD
Karim Valji, MD
Department of Radiology
University of California
San Diego Medical Center
San Diego, Calif

REFERENCES

1. Rose SC, Kinney TB, Valji K, Winchell RJ. Placement of inferior vena cava filters in the intensive care unit. J Vasc Intervent Radiol 1997;6:61-4.
2. Hicks ME, Malden ES, Vesely TM, Picus D, Darcy MD. Prospective anatomic study of the inferior vena cava and renal veins: comparison of selective renal venography with cavography and relevance in filter placement. J Vasc Intervent Radiol 1995;6:721-9.
3. Goff JM, Jr, Puyau FA, Rice JC, Kerstein MD. Problems in placement of the greenfield inferior vena cava filter. Am J Surg 1988;54:544-7.
4. Moore VS, Valji K, Roberts AC, Bookstein JJ. Transcatheter manipulation of asymmetrically opened titanium Greenfield filters. J Vasc Intervent Radiol 1993;4:687-90.

24/41/121057
doi:10.1067/mva.2002.121057

Reply

We would like to thank Drs Rose, Kinney, and Valji for their comments, and we generally concur with their views, although some points should be clarified.

Specific indications for this technique continue to undergo refinement since this feasibility study. All patients in the research study have contraindications to transport, such as an unstable spine, continuous hemofiltration, hemodynamic instability, or hypothermia. Patients who are not in intensive care were

excluded, and the majority of caval filters are still performed in the angiography suite or operating room. However, since beginning this program, we have found that the clinicians at our institution enjoy having this option available for selected patients at risk for transportation complications.

We agree that comprehensive cost analysis is useful to assess comparable techniques. The charge analysis showed no significant difference, and a subsequent cost analysis of a second cohort demonstrates that the bedside IVUS technique is less expensive. Neither of these analyses account for lost opportunity for income in the operating room or angiography suite, which is likely to be significant.

The research protocol was designed with patient safety as a primary concern, and aseptic techniques approved by the infection control director of our hospital were used. The thyroid drape provides length to cover the foot of the bed and side rails, minimizing the risk of contamination. No infections were experienced in this series. Staff are familiar with aseptic techniques in the intensive care unit because right heart catheterization, tracheostomy, gastrostomy, abdominal packing changes, and other more invasive operations are commonly performed when the relative risks of transportation outweigh bedside risks. Also, the mobile cart includes backup inventory, and no procedure was aborted because of catheter malfunction, contamination, or unavailable supplies. It is important to emphasize planning before undertaking these procedures.

Intravascular ultrasound scanning may detect some vena cava abnormalities better than conventional imaging.[1] If the anatomy cannot be clearly defined with IVUS, we would opt for conventional filter placement using fluoroscopy.

We are familiar with the innovative work of Hicks et al with routine selective renal venography. However, this is not a standard practice in the placement of caval filters at our institution because we are not aware of any demonstration of clinical efficacy with these different techniques. Lastly, postprocedure radiographs were performed in this study to assess positioning, and if there is a patient with a maldeployed filter, we would recommend corrective action under fluoroscopic guidance.

In summary, bedside vena cava filter placement is a useful option for selected patients, although careful planning and familiarity with the technique are important.

James L. Ebaugh, MD
Andy C. Chiou, MD, MPH
Mark D. Morasch, MD
Jon S. Matsumura, MD
William H. Pearce, MD
Division of Vascular Surgery
Department of Surgery
Northwestern University Medical School
Chicago, Ill

REFERENCES

1. Marx MV, Taucher JR, Williams DM, Greenfield LJ. Evaluation of the inferior vena cava with intravascular US after Greenfield filter placement. J Vasc Intervent Radiol 1991;2:261-8.

24/41/121056
doi:10.1067/mva.2002.121056

Regarding "High endogenous estradiol is associated with increased venous distensibility and clinical evidence of varicose veins in menopausal women"

We read the article of Ciardullo et al (J Vasc Surg 2001;32:544-9) with great interest, and even more so the comments by Georgiev.[1] We agree with Georgiev in that just by measuring estrogen levels, venous capacity, and the rate of varicose veins, one cannot reach conclusions that "high serum levels of estrogen induced increased venous distensibility" and that the connection of this relationship to the incidence of varicose veins cannot be firmly established based on Ciardullo's findings. Since Gregoriev's letter, it has been shown with appropriate method that female sex hormones increase venous distensibility.[2-3] Since the above studies also report that venous distensibility decreases in animal models of menopause, and Ciardullo did not use a control group with normal cycle, we feel that any speculations for a direct relationship between increased distensibility and an increase in venous varicosity should be considered very cautiously. Moreover, it can further confuse the interpretation of their results on varicose veins and estrogen level in postmenopausal women that they did not report the duration of varicose veins. It would obviously make a big difference whether the menopausal patients developed varicose veins 1 to 2 years before the study or 20 to 30 years ago, as many women have varicose veins as early as their first pregnancy.

Thomas Szaky, MD
Seven Regions Health Centre
Gladstone, Manitoba, Canada

REFERENCES

1. Georgiev M. Regarding "High endogenous estradiol is associated with increased venous distensibility and clinical evidence of varicose veins in menopausal women." J Vasc Surg 2001;33:1134-5.
2. Varbiro S, Nadasy GL, Monos E, Acs N, Vajo Z, Szekacs B. Sex hormone replacement therapy reverses decreased venous distensibility in pharmacologically ovariectomized rats. Menopause 2001;8:204-9.
3. Varbiro S, Vajo Z, Nadasy GL, Monos E, Acs N, Szekacs B. Hormone replacement reduces elevated in vivo venous tone in hypertensive ovariectomized rats. J Soc Gynecol Investig 2001;8:98-103.

24/41/121150
doi:10.1067/mva.2002.121150

Reply

The title of our paper defines very sharply our point of view—we affirm that high endogenous estradiol is associated with increased venous distensibility and clinical evidence of varicose veins in menopausal women. To evaluate this association, we analyzed the cross-sectional data of the screenees for a trial on diet and hormones.[1] By indication our design is not conclusive to demonstrate a causal relationship. We have compared groups of menopausal women with different venous distensibility and prevalence of varicose veins and have evaluated their endogenous statements on causality; according to our findings, it is likely that the residual estradiol level in menopausal women may play a role, a starting point for new and specifically structured studies in women.

We acknowledge the importance of the articles cited by Dr Szaky. These studies have been carried out in ovariectomized rats (not in women) and deal with hormone replacement and not with endogenous hormones; in general, they point out results that we should expect on the basis of our knowledge on the effect of estrogen replacement on the venous system.

Dr Szaky's observation that the absence of a comparison group of women with normal cycle is the reason to be cautious has no ground since there he presumes a comparison between menopausal and premenopausal women, which certainly can complicate rather than indicate the path to a causal relationship evaluation.